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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/546,174	04/11/2000	Chih-Chien Liu	JIA 462C1	4793

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EXAMINER	
SERGENT, RABON A	

ART UNIT	PAPER NUMBER
1711	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/546,174	LIU ET AL.	
	Examiner	Art Unit	
	Rabon Sergent	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *50-69,72-74,78-88 and 90-102* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *50-69, 72-74, 78-88, and 90-102* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 14, 2005 has been entered.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 50-69, 72-74, 78-88, 90-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobben et al. ('126) in view of JP 8-288285.

Tobben et al. disclose the production of semiconductor devices containing electrically conductive wires on a substrate, wherein the method comprises the etching of a layered composite comprising a substrate layer, a titanium/titanium nitride layer (corresponding to applicants' surface layer of claims 61 and 84), an aluminum wiring line layer, an antireflective

coating layer of titanium/titanium nitride (corresponding to applicants' conductive layer of claim 50, applicants' protective layer of claim 61, and applicants' antireflective coating of claim 80), and a cap layer. See figures and columns 2-4, especially column 2, lines 32-46 and column 3, lines 6+. Tobben et al. additionally disclose at column 3, lines 11-24 and Figures 3-5 that a photoresist layer is applied to the cap layer. Tobben et al. further teach at column 4, lines 10-26 that if an additional metalization layer is to be used, then a layer of dielectric material is deposited over the surface of the structure and within the grooves between the wiring lines. Tobben et al. additionally teach that this layer may be formed by depositing silicon dioxide using high density plasma deposition techniques. The subject matter of claims 53 and 63 is considered to be a characteristic of the disclosed deposition process. The subject matter of claims 54 and 64 is disclosed at column 3, line 13. The subject matter of claim 55 is disclosed by the figures. The subject matter of claim 59 is considered to be a characteristic of the etching process, given that the degree of the etching away of the corners is not specified. The subject matter of claims 60 and 69 is considered to be a characteristic of the disclosed deposition process. Similarly, the subject matter of claims 86 and 87 is considered to be a characteristic of the disclosed process. The subject matter of claims 65-68 is disclosed within column 4, lines 5-18. The claimed subject matter pertaining to the differences in dielectric constants between respective layers is considered to be disclosed by Tobben et al. in that Tobben et al. disclose that these layers are formed from different materials; therefore, it follows that the respective layers would have different dielectric constants and the argued graded index of refraction.

4. With respect to claims 56-58 and 87, while Tobben et al. specifically disclose rectangular gaps or grooves, patentees fail to recite other cross-sectional shapes for the grooves, such as

trapezoidal or triangular cross-sections; however, the position is taken that the production of such shapes by controlling the parameters of the etching process was known and conventional at the time of invention. Accordingly, the selection of such cross-sections amounts to an obvious design choice and the implementation of such choices requires only the control of result effective variables.

5. Tobben et al. are silent with respect to applicants' adaptation of the cap layer as it pertains to destructive interference or graded index of refraction (claims 50, 61, and 80), applicants' use of the cap layer as a hard mask (claims 51, 62, and 82), and applicants' use of a different plasma process after the initial use of a HDPCVD process (claim 80). However, each of these features was known within the semiconductor processing art and/or etching art at the time of invention. This position is supported by the teachings of JP 8-288285. Firstly, JP 8-288285 discloses at pages 10 and 11 of the translation that the composition (optical constant) and thickness of the protection insulating film (cap layer) are optimized so that during photolithography, an interference effect is created to minimize reflection. The position is further taken that this disclosure also renders applicants' graded index of refraction limitations obvious, as the disclosed modification would also modify the refractive properties of the modified layer. Secondly, JP 8-288285 discloses at pages 10 and 12 that the cap layer can be used as a mask for patterning the wiring lines. Therefore, the position is taken that it would have been obvious to modify the cap layer of Tobben et al. in accordance with these known techniques so as to yield a more efficient process and higher quality product. One would have expected that the greater control of the patterning or masking of the layers afforded by these modifications would have yielded a product having a more precise wiring line pattern with less defects. Lastly, JP 8-

288285 discloses at page 20 and page 25, lines 14-19 that the planarizing layers can be applied using multiple deposition steps or processes. Therefore, in accordance with the teachings of the secondary reference, the position is taken that it would have been obvious to subsequently use a deposition process different from the initially used HDPCVD process, so as to obtain an optimized or more finely planarized surface.

6. The examiner has considered applicants' arguments; however, they are insufficient to remove the prior art rejection in view of the aforementioned disclosure concerning Tobben et al.'s disclosure pertaining to the location of the photoresist layer and the disclosure bridging pages 10 and 11 of the translation of JP 8-288285 concerning the optimization of the thickness and composition of the protection insulating film (cap layer) to yield an improved photolithographic effect or result. Given that the aforementioned disclosure within the translation of JP 8-288285 establishes a relationship between the properties of the cap layer and the photolithographic step to yield a specific and beneficial result, one of ordinary skill would have been motivated to adjust the characteristics of the cap layer of Tobben et al. as it relates to the photolithographic step/photoresist layer (the characteristics or properties of the photoresist layer being an integral part of the photolithographic step or process), so as to yield an equivalent beneficial result.

Any inquiry concerning this communication should be directed to R. Sergent at telephone number (571) 272-1079.

R. Sergent
February 19, 2006

RABON SERGENT
PRIMARY EXAMINER